

PATENT SPECIFICATION

792,375

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International Classification :—B21c. B29f.

COMPLETE SPECIFICATION.

Improvements relating to the Extrusion of Materials.

We, CRANE PACKING LIMITED, a British Company, of Berwick Avenue, Slough, Buckinghamshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the extrusion of metals or plastic materials, such as polytetrafluorethylene.

It is known on a plastic extrusion machine to maintain gripping pressure on the extruded product, as it is being processed in the machine, by applying a restraining force through the agency of a clamping device. The clamping device employed has hitherto been such that the restraining action can be seriously influenced by variation in the size of the extruded product. Moreover, the mechanical clamping devices used often deform or mark the product, and are difficult to apply if the product is irregular in section.

The object of the present invention is to provide an improved mode of, and simple means for applying the restraining force, whilst eliminating the faults abovementioned.

With this object in view the present invention provides a restraining gear for an extrusion press, adapted for maintaining longitudinal pressure on an extruded product through a clamping device in the form of a collet having a plurality of clamping sections actuated by fluid pressure for clamping the extruded product therebetween. Preferably radial pressure is applied to a multi-section collet by a plurality of fluid cylinder units, there being at least one fluid cylinder unit for each collet section.

A restraining gear in accordance with this invention is illustrated, by way of example,

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in the drawings accompanying the Provisional Specification, wherein:—

Figure 1 is a side view of the gear;

Figure 2 is a sectional plan on line II—II of Figure 1;

Figure 3 is a plan view of a collet and fluid means for applying clamping pressure to an extruded product—a round section product is shown;

Figure 4 is a cross section on line IV—IV of Figure 3; and

Figures 5, 6 and 7 illustrate collets for extruded products having non-circular cross sections.

In the restraining arrangement illustrated in the drawings a carrier 1 is provided which comprises a hub 2 and a plurality of flat arms 3 radiating from one end of the hub, each arm having mounted thereon a fluid cylinder 4. The three cylinders have slidable plungers 5 adapted to apply equal pressure to the three clamps 6 constituted by the sections or segments of a collet. In Figures 3 and 4, the collet is shown as a cylindrical bush which is split longitudinally by vee-shaped cuts, which eliminate marking the surface of the extruded product, such as the formation of small ribs if straight cuts were used in line with the axis. Alternatively straight cuts made at an angle to the axis of the product may be used. The three cylinder plungers 5 apply radially inward clamping pressure on the product 7, which is of round section in Figures 3 and 4. Figures 5, 6 and 7 illustrate products 7A, 7B, 7C having non-circular cross sections, and show suitable collet segments 6A, 6B, 6C for use therewith; the direction of applied clamping pressure is indicated by arrows and it will be noted that for section 7B it is preferable to use four fluid clamps.

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The hub 2 of the carrier 1 is connected by a diametrically aligned trunnion pins 8 to parallel levers constituting a beam 9 which at one end is anchored to a fixed pivot pin 10 and at the other end is articulately attached to a tie-bar 11 suspended from one limb of a bell-crank 12. The other limb of the bell-crank 12 bears upon a plunger 13 slidable in a fluid cylinder 14. While the plungers 5 grip the collet segments 6 to apply radial clamping pressure to the product 7, the restraining force applied lengthwise through the carrier 1 creates tension in the tie-bar 11 and the magnitude of this tension is transmitted through bell-crank 12 and plunger 13 to fluid in cylinder 14, a pressure gauge 15, which may be remotely situated, being connected to cylinder 14 so that the restraining force is indicated.

What we claim is:—

1. A restraining gear for an extrusion machine, adapted for maintaining longitudinal pressure on an extruded product passing from the extrusion die, by applying a restraining force through a clamping device, characterised in that the clamping device is in the form of a collet having a plurality of clamping sections actuated by fluid pressure

for clamping the extruded product therebetween.

2. A restraining gear as claimed in Claim 1, in which radial pressure is applied to a multi-section collet by a plurality of fluid cylinder units, there being at least one fluid cylinder unit for each collet section.

3. A restraining gear as claimed in Claim 2, wherein the several cylinder units are mounted on a carrier supported on a pivoted beam system.

4. A restraining gear as claimed in Claim 3, wherein said pivoted beam system comprises a pair of parallel levers each pivoted at one end to a fixed anchorage and each connected at the other end to a linkage adapted to impart movement to a piston in a fluid cylinder whereby to indicate on a fluid pressure gauge the restraining force applied to the collet.

5. A restraining gear for an extrusion machine, said gear being constructed substantially as herein described with reference to the drawings accompanying the Provisional Specification.

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PROVISIONAL SPECIFICATION.

Improvements relating to the Extrusion of Materials.

We, CRANE PACKING LIMITED, a British Company, of Berwick Avenue, Slough, Buckinghamshire, do hereby declare this invention to be described in the following statement:—

This invention relates to the extrusion of metals or plastic materials, such as polytetrafluorethylene.

It is known on a plastic extrusion machine to maintain a pressure on the product as it is being processed in the machine by applying a restraining force through the agency of a clamping device. The clamping device employed has hitherto been such that the restraining action can be seriously influenced by variation in the size of the extruded product. Moreover, the mechanical clamping devices used often deform or mark the product, and are difficult to apply if the product is irregular in section.

The object of the present invention is to provide an improved mode of, and simple means for applying the restraining force, whilst eliminating the faults abovementioned, and with this object in view the invention provides a clamping device in the form of a collet having a plurality of sections through which fluid pressure is applied to the extruded product clamped therebetween.

A restraining gear in accordance with this invention is illustrated, by way of example, in the accompanying drawings, wherein:—

Figure 1 is a side view of the gear;

Figure 2 is a sectional plan on line II—II of Figure 1;

Figure 3 is a plan view of a collet and fluid means for applying clamping pressure to and extruded product—a round section product is shown;

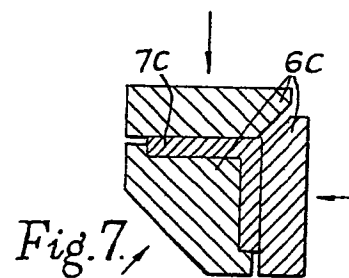
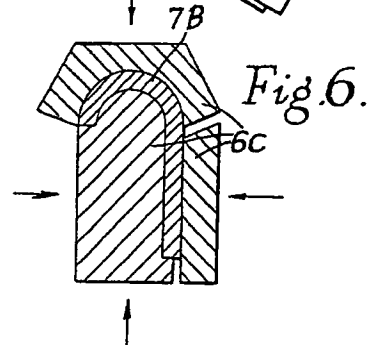
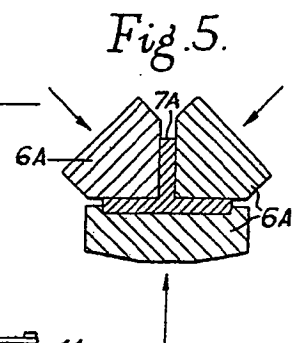
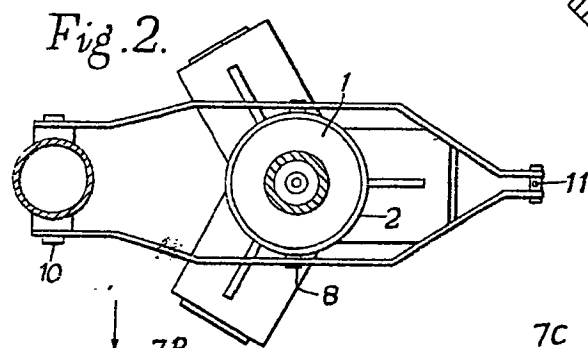
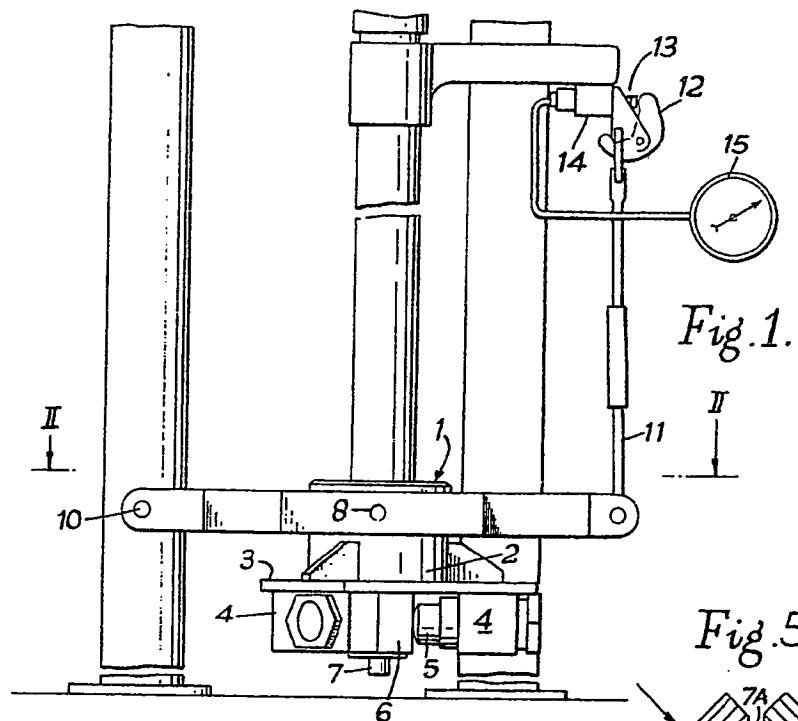
Figure 4 is a cross section on line IV—IV of Figure 3; and

Figures 5, 6 and 7 illustrate collets for extruded products having non-circular cross sections.

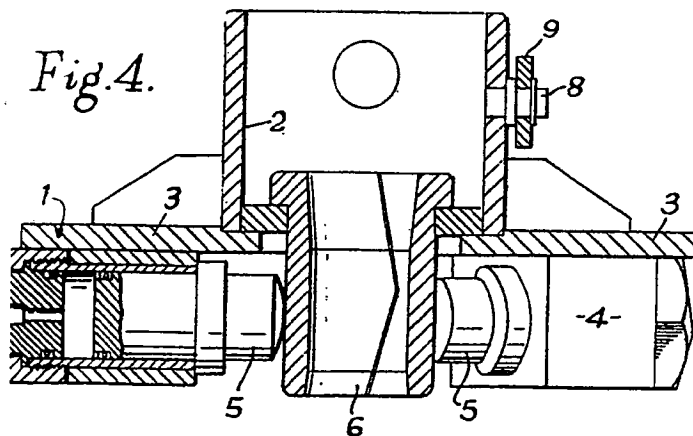
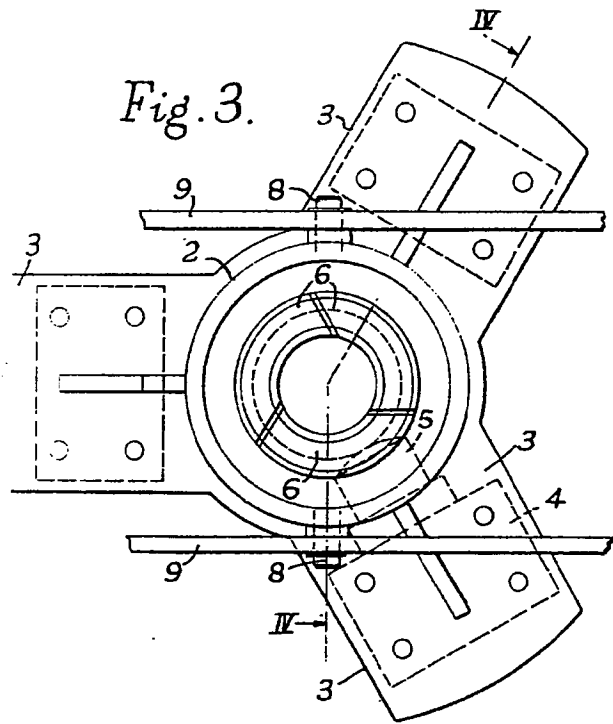
In the restraining arrangement illustrated in the accompanying drawings a carrier plate 1 is provided which comprises a hub 2 and a plurality of flat arms 3 radiating from one end of the hub, each arm having mounted thereon a fluid cylinder 4. The three cylinders have slidable plungers 5 adapted to apply equal pressure to the three clamps 6 constituted by the sections or segments of a collet. In Figures 3 and 4, the collet is shown as a cylindrical bush which is split longitudinally by vee-shaped cuts, which eliminate marking the surface of the extruded product, such as the formation of

- small ribs if straight cuts were used in line with the axis. Alternatively straight cuts made at an angle to the axis of the product may be used. The three cylinder plungers 5 apply radially inward clamping pressure on the product 7, which is of round section in Figures 3 and 4. Figures 5, 6 and 7 illustrate products 7A, 7B, 7C having non-circular cross sections, and show suitable collet segments 6A, 6B, 6C for use therewith; the direction of applied clamping pressure is indicated by arrows and it will be noted that for section 7B it is preferable to use four fluid clamps.
- The hub 2 of the carrier plate 1 is connected by diametrically aligned trunnion pins 8 to parallel levers constituting a beam 9 which at one end is anchored to a fixed pivot pin 10 and at the other end is articulately attached to a tie-bar 11 suspended from one limb of a bell-crank 12. The other limb of the bell-crank 12 bears upon a plunger 13 slidable in a fluid cylinder 14. While the plungers 5 grip the collet segments 6 to apply radial clamping pressure to the product 7, the restraining force applied lengthwise through the carrier plate 1 creates tension in the tie-bar 11 and the magnitude of this tension is transmitted through bell-crank 12 and plunger 13 to fluid in cylinder 14, a pressure gauge 15, which may be remotely situated, being connected to cylinder 14 so that the restraining force is indicated.
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